NATIONAL CASE NOTE REVIEWS

AUSTRALIAN AND NEW ZEALAND AUDIT OF SURGICAL MORTALITY

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Contents

Chairman's report

This is the first National Case Note Review Booklet of the Australian and New Zealand Audit of Surgical Mortality (ANZASM).

It provides important lessons for all surgeons that, if learnt, could lead to better outcomes for our patients.

Many cases come from the public hospital system and emphasise the need to have in place systems that provide adequate handover of care, as well as prompt notification of problems or change in the condition of the patient.

ANZASM now covers all states and territories in Australia, and New Zealand seems close to embracing the concept. Each state has its own audit office to keep the process local, but data from each state are pooled into the national report.

The Royal Australasian College of Surgeons has now mandated participation in the audit (when it is available) and the Commonwealth Qualified Privilege ensures the data can only be used for the purposes of the audit.

I trust you find the Case Note Review Booklet an educational opportunity and would welcome any constructive feedback.

Professor Guy Maddem
Chair, ANZASM

Overall recommendations

- In complex cases, there needs to be clear demonstrable leadership in patient management. There should be regular team meetings with all disciplines involved to ensure the treatment plan is understood by all.
- Accurate documentation and use of medically appropriate terminology must be encouraged. If junior staff complete reports, these must be formerly checked by a consultant, or junior staff must be informed in advance on the salient points to record.
- Where the cause of death is not obvious, a postmortem can provide the diagnosis.
- The surgical case form record has to contain good, accurate documentation that is made available to all treating doctors.
- Where clinical deterioration occurs in a patient and where there is no clear cause, remember the cause may be related to something outside your specialty knowledge base.

Case study 1

Postoperative decompensation in cirrhotic patients

Case Summary

An elderly patient had liver cirrhosis due to hepatitis C infection and was admitted with a suspected diagnosis of a liver tumour. The patient was admitted for laparoscopy and biopsy of a liver lesion which was said to be 'newly diagnosed hepatocellular carcinoma (HCC)'. The case notes stated that the patient had been investigated some months previously for ascites, at which time malignant cells had been found in the ascitic fluid.

A computed tomography (CT) scan was said to show a cirrhotic liver, portal vein thrombosis, an enlarged spleen and oesophageal varices. In addition to this, there were several regions of arterial phase enhancement in the liver on CT, raising the possibility of a multifocal tumour. The reason for admission was for the biopsy of one or more of these lesions. There was no record of preoperative liver function tests in the notes.

The patient underwent a laparoscopy by a consultant surgeon on the day of admission and had an intraoperative ultrasound and biopsies of three separate regions in the liver. The operative note did not describe the size of the lesions, but clearly there was evidence of severe portal hypertension at laparoscopy.

One of the biopsy sites continued to bleed, and the procedure had to be converted to an open operation for control of haemorrhage. The anaesthetic charts indicate that the procedure took just over two hours in total and the estimated blood loss was approximately 800 mL.

The day following surgery the patient was sitting out of bed and making steady progress. The patient had required a urinary catheter for postoperative urinary retention, and blood screens showed a stable haemoglobin level and reasonable liver function, with a normal bilirubin level, a reduced albumin level and an International Normalised Ratio (INR) of just over 1.

Over the following days the patient made steady improvement and resumed a ward diet. The patient's routine diuretics were withheld during this period. Just under a week following the operation it was noted that there was discussion on the ward round about possible subsequent resection of the biopsy proven tumour in the patient's right lobe of liver.

The following day the patient was febrile and had a raised white cell count and was found to have a urinary tract infection, which was treated with antibiotics. The patient was noted to have some peripheral oedema and abdominal distension consistent with ascites. Diuretic therapy was recommenced and the patient was reviewed by the gastroenterology registrar who made a

diagnosis of decompensated cirrhosis, although at that time the patient had a normal bilirubin level and INR. The patient was then moved to the gastroenterology ward. Some days after the transfer, and nearly 2 weeks following admission, the patient was found collapsed on the bathroom floor in the ward. The cardiac arrest team was called but the patient was unable to be resuscitated.

Assessor's Comment

The first-line assessor in this case queried the reason for the original procedure. The question arose as to whether a tissue biopsy was required in this patient to confirm the diagnosis of HCC. The case notes indicated that the patient had known cirrhosis, hypervascular lesions on CT scan and a highly elevated alpha-fetoprotein (AFP) level. The patient also had evidence of portal hypertension and was said to have malignant cells diagnosed in ascitic fluid some months prior to this admission.

Given these details it may have been possible to accept a diagnosis of HCC in this patient without resorting to biopsy. The size of the lesions on CT was not recorded, which is relevant if the lesions are small (less than 2 cm) and hard to characterise. Another form of imaging such as contrast enhanced magnetic resonance imaging scanning may have been of value to assist with the diagnosis, and might have avoided the need for a biopsy.

It is also unclear what therapy was intended, although there was comment in the case notes about a possible liver resection. In the setting of previous malignant ascites this would not seem justified, and in the setting of severe portal hypertension resection would be contraindicated. Based on the evidence available it is difficult to see how a biopsy would have altered this patient's management.

When bleeding occurred during the biopsy procedure, it was managed quite expeditiously by an experienced consultant surgeon, and the patient made a reasonable recovery in the early postoperative period. The decision to withhold the patient's diuretics was presumably triggered by the early postoperative renal failure.

Renal function rapidly improved and continued withdrawal of the routine preoperative diuretics probably contributed to the development of ascites.

Management of the ascities was reasonable under the circumstances. The surgical case form was filled in by an advanced trainee who stated that the patient developed postoperative liver failure and that this was the cause of death.

This was not the case, as the patient's liver function was well compensated on blood tests done less than 24 hours before death.
The fact that the patient died suddenly nearly 2 weeks postoperatively, while moving independently around the ward, would suggest either a pulmonary embolus or a cardiac event.

Appropriate deep vein thrombosis (DVT) prophylaxis was used from the day of admission. Unfortunately without an autopsy the exact cause of death cannot be certain. Overall this patient died from a compounding series of problems which occurred following a laparoscopy for a liver biopsy to confirm a diagnosis of malignancy.

It seems likely that this diagnosis could have been achieved by other methods, so the main lesson of this case is to carefully consider the indications for any invasive procedure on a patient with chronic liver disease.

Case study 2

Fatal aspiration following early postoperative feeding

Case Summary

An elderly patient was admitted for an elective right hemicolectomy for a proven carcinoma of the caecum. There was a past medical history of treated hypertension, a coronary artery stent, and a previous transient ischemic attack some years prior to admission. The procedure was done on an afternoon list during normal working hours, with a consultant surgeon as the primary operator and an advanced trainee assisting.

The following morning the medical note indicated that the patient was stable, with a soft abdomen. The nursing notes later in the day indicated that the patient was nauseated and that antiemetics were administered.
The following day the medical note indicated a stable patient and free oral fluids were commenced.

There was no record of an abdominal examination or whether there was any sign of bowel function returning. The nursing notes indicated that the patient was continuing to take oral fluids, although there were also entries indicating that the patient was nauseated at times.

The patient did not seem to have any significant abdominal pain and was refusing offers of analgesia.
The intravenous (IV) fluids were ceased on the same day on the basis that oral intake was tolerated.and that antiemetics were administered.
The following day, 36 hours postoperatively, the medical note indicated a stable patient and free oral fluids were commenced.

There was no record of an abdominal examination or whether there was any sign of bowel function returning. The nursing notes indicated that the patient was continuing to take oral fluids, although there were also entries indicating that the patient was nauseated at times. The patient did not seem to have any significant abdominal pain and was refusing offers of analgesia. The IV fluids were ceased on the same day on the basis that oral intake was tolerated.

The following morning, it was noted that the patient had felt weak and the abdomen was noted to be distended and tympanic. The patient had not passed flatus at this time but bowel sounds were noted to be present.
The medical note concluded with a comment that the patient was to remain on free fluids. There was no mention of restarting intravenous fluids or inserting a nasogastric tube.

Several days postoperatively, the patient complained to the nursing staff of feeling unwell and did not wish to get out of bed. Later on the same day the patient vomited and was given antiemetics. Oral fluids were refused and an IV line was inserted.

The patient's condition deteriorated suddenly, with desaturation noted and the surgical cover was asked to make an assessment. The comment in the notes was that the patient had gross abdominal distension. The nursing notes indicated that the patient's desaturation occurred after an episode of vomiting.

Over the next few hours, there was further deterioration, resulting in a transfer to the intensive care unit (ICU). After review by the duty intensive care specialist and anaesthetist, discussions were held with the surgeon and family. There was concern the patient may have had an anastomotic leak or ischaemic intestine. In the early hours of the morning the patient sustained a cardiac arrest in the ICU but was successfully resuscitated, and following this a decision was made to take the patient to theatre urgently.

At operation there was a small amount of free fluid in the abdomen. The anastomosis was intact and there was no evidence of bowel ischaemia. The small bowel was noted to be grossly distended up to the point of the anastomosis.

The patient already had a nasogastric tube inserted and the small bowel content was aspirated via this. The patient was returned to the ICU where there was continued deterioration despite increasing isotropic support.

The situation was discussed with the family who indicated that the patient had previously stated that they did not want excessive life support measures. In view of this, a decision was taken to limit treatment and the patient died in the ICU some 7 hours following the second laparotomy.

Assessor's Comment

This elderly patient was clearly always at considerable risk in undergoing major abdominal surgery, but with proven colon cancer there was little choice but to go ahead with the procedure. Technically the management of the initial resection seems to have been perfectly adequate and the patient tolerated the procedure very well.

It appears, however, that the postoperative management was not optimal. The patient was commenced on oral fluids approximately 15 hours after a major bowel resection without any apparent recognition of the possibility of a postoperative ileus.

The patient seems to have had little in the way of postoperative pain initially, and this may have caused a false sense of security in the medical attendants. Unfortunately there was no evidence of bowel activity and the oral intake was simply compounding the postoperative ileus by increasing small bowel distension.

The patient was recorded as having a distended tympanic abdomen, which should have been a signal to the surgical team that all was not well. A nasogastric tube placed at this point, with aspiration of the stomach and restarting intravenous fluids may have prevented the subsequent series of events.

The desaturation which occurred later that day seems directly related to recurrent episodes of vomiting. The final laparotomy findings which showed grossly distended small bowel but no evidence of anastomotic leak would also support this.

There is currently a move towards fast track postoperative recovery for all types of major surgery. Unfortunately some aspects of postoperative care cannot be imposed arbitrarily and intestinal function returns at a variable rate following a laparotomy.

It seems that in this case a more cautious postoperative approach would have been more appropriate, with delay in oral feeding until there was some evidence of a return of bowel function.

Case study 3

Recognition of paralytic ileus

Case Summary

An elderly patient was admitted for an ultra-low anterior resection, with a colonic J pouch, a pouch-anal anastomosis and loop ileostomy for the treatment of a low rectal cancer. The comorbidities included hypertension, chronic obstructive airways diseases, sleep apnoea and carotid vascular disease.

The abdominal surgery was uneventful. Initially, the postoperative course gave no cause for concern. There was some early ileostomy action. Clear fluids orally were started. The urinary catheter was removed and a light diet started.

Some days postoperatively, it was noted that venous thromboembolism prophylaxis had not started and subcutaneous heparin was given. Soon thereafter the patient became confused and agitated.

The patient was suspected of suffering alcohol withdrawal and was treated with diazepam, thiamine and haloperidol. Sputum retention and bilateral pulmonary infiltrates were present on a chest x-ray and atrial fibrillation was diagnosed. Investigations excluded pulmonary embolism.

Nearly a week postoperatively, the abdomen was reviewed by a CT scan which suggested paralytic ileus. Clear fluids were continued but abdominal distension persisted.

A week after surgery, an emergency call was made. A nasogastric tube was inserted and the patient was placed on nil by mouth, after vomiting nearly 3 L of faeculent fluid followed by nearly a further 3 L. Pulmonary aspiration was recognised to have occurred. Despite resuscitation, the patient's condition continued to deteriorate and death occurred soon thereafter.

Assessor's Comment

If the decision is made not to insert a nasogastric tube preoperatively, junior surgical staff and nursing staff need to be aware of the physical signs and radiological features of postoperative ileus, which would permit recognition and management of the condition.

Earlier insertion of a nasogastric tube may have prevented vomiting and probable aspiration leading to death.

Case study 4

A complication of arterial puncture for coronary angiography

Case Summary

An elderly patient presented to Hospital A with breathlessness and was admitted under a medical team. Comorbidities included hypertrophic cardiomyopathy, hypotension, atrial fibrillation and hyperlipidemia.

Shortly after admission, the patient became hypotensive and developed chest pain. Clopidogrel and enoxaparin were started. One week later, the patient was transferred to Hospital B for coronary angiography which was performed via a puncture of the right femoral artery.

Following the procedure, bruising and tenderness were noted in the right groin. The patient was transferred back to Hospital A. The next day, the bruising and swelling in the right groin increased. There was no further clinical concern recorded until nearly a week later when the patient complained of severe right groin pain.

Examination revealed a large tense swelling in the upper right thigh. An ultrasound was performed. The formal results were not included in the notes although a provisional diagnosis of ruptured pseudoaneurysm was recorded.

Several hours later, the patient became hypotensive and unresponsive.
A medical emergency call was made.

There was a massive expanding haematoma in the right groin. Transfer to Hospital C for specialist vascular care took several hours during which time resuscitation started with blood products and coagulation factors.

A CT scan showed a large haematoma in the right groin, extending up the anterior abdominal wall. Nearly half a day after admission to the ICU in Hospital C, surgery was performed to stop the bleeding from the femoral artery.

The pathology appeared to be a ruptured pseudoaneurysm. Following surgery, hypotension persisted despite inotropes and the patient died nearly a day later.

Assessor's Comment

Pseudoaneurysm is a complication of angiography and is a surgical emergency. Applying pressure to the groin to control bleeding is an effective initial manoeuvre to control blood loss from an artery.

Immediate surgery is required to control blood loss. Ultrasound is an effective diagnostic tool for pseudoaneurysm. This complication may be treated using endoluminal techniques which may be preferable to an open operation.

Case study 5

Early treatment of obstructive urosepsis (1)

Case Summary

An elderly diabetic patient was admitted to Hospital A with fever, impaired consciousness, hypotension, renal impairment and offensive urine. The provisional diagnosis was urosepsis but ultrasound imaging was not performed for nearly a day after admission and there was no initial surgical review.

After admission a urology registrar in Hospital B was contacted to request transfer. The plan was for a CT scan of the abdomen and probable nephrostomy. Nearly 3 days after admission the patient was transferred and ureteric stents were finally inserted after initial admission to Hospital A. Despite treatment in intensive care, deterioration continued and the patient died.

Assessor's Comment

Urosepsis in the elderly requires urgent treatment. This is all the more so, if urinary obstruction is present. Early surgical (urology) consultation is essential and once the diagnosis of an obstructed urinary system with infection is made, early transfer to an appropriate hospital is necessary.

Case study 6

Early treatment of obstructive urosepsis (2)

Case Summary

An elderly patient with diabetes mellitus, hypertension and cardiovascular disease presented to an emergency department with clinical signs suggestive of left ureteric colic. The patient was haemodynamically stable. Blood was present in the urine and traces of nitrites were found, suggesting infection. The patient was noted to be febrile. A urology registrar reviewed the patient and the diagnosis of an obstructed kidney was made on a CT scan. Hypotension continued overnight and the medical emergency team call was made the next morning, when the blood pressure had fallen further and anuria was present. It was only at this time that the urology team was notified about the deterioration. Despite urgent and appropriate treatment by the urologists, multi-organ failure resulted in death.

Assessor's Comment

Particularly in a diabetic patient with sepsis and an obstructed kidney, early intravenous antibiotic therapy is critical. The case highlights the importance of recognition by junior medical staff of the deteriorating patient - hypotension and anuria are critical observations requiring communication with senior medical staff.

Case study 7

Postoperative bleed following a laparoscopic posterior hiatal hernia repair, partial fundoplication and cholecystectomy

Case Summary

An elderly patient with a symptomatic and very large hiatus hernia and cholelithiasis underwent an uneventful laparoscopic posterior hiatal hernia repair, partial fundoplication and cholecystectomy.

The thorough preoperative multidisciplinary assessment confirmed the procedure was clinically necessary and should proceed despite the significant comorbidities of ischaemic heart disease, hypertension, permanent pacemaker, respiratory impairment, renal impairment and controlled pernicious anaemia. The initial postoperative phase was managed in the high dependency unit (HDU).

The patient's recovery was uneventful until nearly a week after surgery when a medical emergency team (MET) call was initiated after the patient became hypotensive and collapsed in the toilet. Intravenous fluids, morphine and antiemetics were given and appeared to have good effect.

The episode was considered to be a vasovagal event and no further investigations or treatments were initiated. Shortly afterwards, a second MET call was prompted by a further episode of severe hypotension. The response this time required endotracheal intubation in addition to IV fluids and inotropes.

Investigations at this time indicated blood loss to be the cause of the hypotension. The surgical registrar was contacted who, in turn, contacted the consultant 1 hour after the second MET call. An immediate return to the operating room was organised, but the patient died within half an hour.

Assessor's Comment

The patient suffered a hypotensive collapse on the ward and died around 5 hours later. There is strong clinical evidence that the collapse and subsequent death were due to internal bleeding, the recognition and management of which were grossly delayed.

More aggressive investigation and resuscitation at that time may well have altered the outcome. By the time the surgeon was notified, a fatal outcome was unavoidable.

When a postoperative patient has a significant hypotensive event, the diagnosis of vasovagal attack should only be considered after other conditions, including blood loss, have been excluded.

It is noted that the hospital's documentation carries the advice: 'If this patient has more than two MET calls in 24 hours, the ICU and treating consultant MUST be notified'. It might be more appropriate if the treating consultant is notified of all MET calls.

Case study 8

Blood loss in patient following angiography and stenting

Case Summary

An elderly patient with peripheral vascular disease and increasing chest pain was admitted for angiography and stenting. Two tight stenoses in the distal (left) superficial femoral artery were confirmed and angioplasty was performed via the common femoral artery.

Pre-procedural anticoagulation was appropriate and the procedure was uncomplicated. The patient's intraprocedural blood pressure was significantly elevated.

Shortly after the removal of the femoral catheter in recovery, there was a dramatic drop in the patient's blood pressure.

There is no record of medical staff being notified of this. There was spontaneous improvement in blood pressure to low normal, prompting a return to the ward. Nearly an hour later, the patient's blood pressure had dropped significantly and abdominal distension was noted. This precipitated a MET call.

Following assessment by an intern, fluid resuscitation was initiated and a CT scan arranged. Haemoglobin on a blood gas sample was reduced below normal.

A CT scan demonstrated active bleeding from the common femoral artery and a large retroperitoneal haematoma. The vascular registrar attempted, but was unable, to contact the vascular consultant.

The radiologist then placed a covered stent in the common femoral artery with good result. Despite ongoing resuscitation in ICU, the patient remained profoundly acidotic and died within a few days.

Assessor's Comment

Failure to act on the initial dramatic fall in blood pressure immediately following an interventional procedure. Nearly an hour time gap until the next set of observations, the apparent inability to contact the vascular consultant, the decision to send an unstable patient for a diagnostic study without input from a more senior clinician are all concerning signs.

Blood loss is a known and anticipated consequence of arterial cannulation, using sheaths of varying sizes, which allow endovascular diagnostic and interventional procedures. Blood loss following such procedures is not uncommonly hidden in the retroperitoneum, often without external evidence of bleeding, groin swelling or visible bruising.
Elderly patients undergoing these procedures often have multiple medical comorbidities and poor tolerance of blood loss.

Proactive clinical evaluation of vital signs and abdominal examination will usually lead to the recognition of blood loss, allowing expeditious resuscitation and closure of any bleeding site. This can be achieved either by open exposure and lateral suture, or endovascular placement of a covered stent.

Post-procedural orders need to be specific and conveyed both in writing and verbally to the recovery room and ward staff. Deviation from the expected course should prompt early patient review and possible escalation of patient care.

The expected course needs to be detailed, with observation of vital signs, type and frequency, with reportable limits on observation and escalation of criteria. Postoperative orders need to be specific and in particular specify the doctor to be notified of breaches in the written observable limits. Tachycardia may not be evident, as many of these patients are on long-term beta-blockade medication.

Both junior and senior medical staff must have readily available lines of communication and be available for consultation, clinical assessment and, if necessary, clinical intervention.

All invasive procedures should be covered by postoperative orders, detailing vital signs, their type and frequency, special observations and reportable limits on observations and escalation criteria. Deviation from the expected course should prompt patient review and possible escalation of patient care.

Case study 9

Revision left total knee replacement – laparotomy/ bowel resection/femoral herniorrhaphy

Case Summary

An elderly patient with mild comorbidity (hypertension and gastro-oesophageal reflux) was admitted for a total knee replacement. The patient was transferred to the rehabilitation unit after an uneventful surgery. The intern notes indicate no abdominal examination was performed and no cause was suggested.

Over the next week the nausea and vomiting persisted. Occasional watery diarrhoea was noted and an infective cause was suggested. A fluid balance chart does not seem to have been kept over this time. A case note entry stated that suprapubic tenderness was present.

Treatment centred around antiemetics, oral and IV fluids. Gastroenteritis, side effects of opiate analgesia or postoperative ileus were listed as possible causes for persisting symptoms. An abdominal x-ray done after a further period demonstrated distended bowel loops and this prompted a surgical referral. When a general surgical registrar reviewed the patient several days later and diagnosed an obstructed left femoral hernia, the patient was tachycardic and hypotensive.

At laparotomy, a strangulated left femoral hernia with perforated small bowel and extensive peritoneal soiling was found. In addition to repair of the femoral canal, a small bowel resection with end-to-end anastomosis and extensive abdominal lavage was performed. Postoperative care was provided in intensive care.

The day after the laparotomy, spreading abdominal cellulitis led to the wound being opened with discharge of haemoserous fluid with odour. The surgical team was informed and felt that further surgical intervention would be of no benefit. Over the next few days the patient become more acidotic with increasing inotrope requirements and required haemofiltration. Death subsequently occurred.

Assessor's Comment

The care provided by the medical rehabilitation unit appears to have been inadequate, firstly in respect of fluid and electrolyte management, and secondly by failure to establish a cause for the ongoing vomiting, abdominal distension and constipation.

The failure to involve a more senior surgeon in the assessment of the patient is worth noting. This led to a delay in the investigation for a possible surgical cause. The outcome in this patient could have potentially been avoided if an appropriate and timely surgical referral had been made.

The patient was in a rehabilitation unit for 1 week with anorexia, nausea, persistent vomiting, minimal bowel action and abdominal distension, without establishing a diagnosis. Postoperative ileus is an unusual complication of knee replacement and other surgically-related causes should have been considered.

The case notes are deficient, with no documentation of medical history and physical examination on the day of admission. The initial assessments appear to have been done by very junior staff. Appropriate investigations (e.g. CT scan) towards a diagnosis were not ordered. Fluid balance was not recorded in a patient described as having daily vomiting and poor intake.

Subsequent management in terms of surgical intervention and postoperative resuscitation in the ICU were appropriate, but there is a real likelihood that the outcome would have been different had the diagnosis been made earlier.

Case study 10

Congenital heart defects

Case Summary

A neonate with a constellation of congenital heart defects, including hypoplastic left heart syndrome, was referred for a surgical procedure based on reported preoperative echocardiographic findings. Intraoperative findings differed from expected and a complex biventricular repair was attempted.

The child failed to wean from cardiopulmonary bypass due to low outflow from the left ventricle. An alternative procedure was performed but the child again failed to wean from bypass. Despite extracorporeal membrane oxygenator being initiated, successful support was not achieved and the child died.

Assessor's Comment

Therapy recommended by cardiac teams needs to involve consideration of the very high mortality and unproven long-term outcomes for such patients. The imperative of well-established preoperative diagnosis is critical.

Complex decisions require complex analytical thought processes. When the unexpected arises, surgeons are required to 'think on their feet'. This is no more clearly demonstrated than in paediatric cardiac surgery.

The availability of experienced colleagues to discuss challenging clinical problems at the point-of-care is essential. This neonate had a number of complex congenital heart defects including hypoplastic left heart syndrome, a recognised very high-risk clinical situation.

A number of opinions were wisely used in preoperative planning and when the unexpected was encountered, intraoperative collegiate discussion was of great value allowing the surgical design to be revised, lessening the intellectual stress on the primary surgeon.

Sadly, the patient died but maintenance of quality standards and multi-source collegiate discussion remained the priority throughout the care process.

Case study 11

Malignant bowel obstruction

Case Summary

A young patient was admitted under the care of a general physician with a unilateral deep vein thrombosis (DVT). There was a history of abdominal pain, recurrent urinary tract infections and recent pneumaturia. The patient was cachectic, anaemic and a midstream specimen of urine (MSU) confirmed a urinary tract infection (UTI).

The patient was anti-coagulated and transfused. An upper gastro-intestinal endoscopy was performed, but failed to identify the cause of anaemia. From the outset, abdominal distension was a prominent feature. Abdominal x-rays identified distension of both large and small bowel. A colonoscopy was booked for the following day, but cancelled and not formally re-booked.

After nearly a week an abdominal ultrasound scan identified ascites and thereafter a General Surgical team was asked to review the patient. A computed tomography (CT) scan was performed the following day. The abdominal CT scan identified enlarged iliac lymph nodes, sigmoid thickening in two segments with dilatation of both small and large bowel.

It also showed a clear-cut sigmoid carcinoma with apple core constriction producing large bowel obstruction. There was also an obvious small bowel obstruction with decompressed loops of small bowel evident on the films as well as a probable point of obstruction due to adherence of the small bowel to the main tumour mass.

A flexible sigmoidoscopy performed nearly 2 weeks after admission confirmed the presence of a recto-sigmoid carcinoma. A new surgical team was consulted, an Intravenous cholangiogram (IVC) filter was inserted the following day proceeded by a laparotomy.

At surgery, two colonic tumours were confirmed. A mobile, proximal sigmoid lesion was identified as well as a locally advanced, recto-sigmoid cancer that invaded the bladder and the left pelvic side wall.

The surgeon opted for a Hartmann's resection that involved an extensive bladder resection.
The patient subsequently required re-operation because of urinary leak, developed progressive fungal sepsis and died 3 weeks after admission.
Histopathological analysis confirmed extensive lymph node involvement by tumour and involved surgical margins.

Assessor's Comment

Notwithstanding the patient's age the combination of the abdominal pain, colonic distension, recurrent urinary tract infections, pneumaturia, iron deficiency anaemia and cachexia should have pointed the managing clinical team and the first surgical team to the diagnosis of colorectal cancer.

Despite the patient's debilitated state, flexible sigmoidoscopy should have been undertaken as a matter of much higher priority than upper gastro-intestinal endoscopy or even abdominal ultrasound.

Under-reporting of the abdominal CT scan clearly demonstrated a sigmoid cancer. Having ordered the CT scan, the results should have not only reviewed but should have acted upon it.

It was left to the admitting clinical team to organize the flexible sigmoidoscopy and to involve a second surgical team in this patient's ongoing management. Given the patient's very poor general medical condition and the clearly advanced local stage of the recto-sigmoid cancer a much less ambitious intraoperative strategy would have been better.

On this occasion a defunctioning stoma to allow neo-adjuvant chemo-radiotherapy and later surgical resection would have been a safer strategy.

This patient was admitted late in the course of their overall illness and the most significant delay in diagnosis actually preceded the patient's admission.

Just the same a much more prompt progress to diagnosis by CT scan and flexible sigmoidoscopy and a less ambitious intraoperative strategy might well have seen the patient survive this presentation even if not see them being ultimately cured.

Case study 12

DVT & pulmonary embolism

Case Summary

An elderly patient died from a fatal pulmonary embolus nearly 2 weeks after a radical cystectomy and right nephroureterectomy with ileal conduit formation.

There was always at least a moderate risk of perioperative death as the patient had pre-existing comorbidities of ischaemic heart disease and renal impairment (American Society of Anaesthesiologists Level 3) as well as being of advanced age.

The patient was at high risk of postoperative deep vein thrombosis/ pulmonary embolism (DVT/PE) and may probably have received more aggressive prophylaxis. A month prior to the operation the patient had undergone a transurethral bladder tumour resection and insertion of ureteric stents in a private hospital.

This procedure was covered by subcutaneous (s/c) heparin for around 3 days. The notes provided are brief but it would seem the patient had difficulty walking after that operation (unstated reasons) and did not leave hospital between that operation and the cystectomy.

It is unclear as to whether the patient received ongoing heparin during that time On the day before the cystectomy the resident medical officer's admission notes state the patient had a past history of DVT and PE. This was not recorded at the pre-admission clinic or by the consultant anaesthetist at the same clinic, nor was it entered on the surgeon's admission/ consent form.

The patient received an average dose of s/c heparin the night before the cystectomy, but no heparin at all on the day of surgery. Calf-compressions were used during the operation and for the first 24 hours.

Thereafter, the patient wore thrombo-embolism deterrent (TED) stockings and received a further average dose of s/c heparin twice daily until death.

Postoperatively, the patient had a prolonged ileus requiring total parenteral nutrition (TPN) support. The physiotherapists clearly had considerable problems mobilising the patient, partly due to the clinical condition of the patient.

Assessor's Comment

This patient was at considerable risk of DVT/PE, yet, for unstated reasons, did not receive heparin on the day of surgery, these doses arguably being the most important. Consideration could have been given to more aggressive prophylaxis both pre- and post-operatively e.g. Clexane 40 mg s/c daily or even a higher dose.

Case study 13

Urosepsis (3)

Case Summary

An elderly diabetic man with a past history of ischaemic heart disease was admitted for elective bladder neck incision and removal of a bladder stone. The patient had previously undergone a transurethral resection of the prostate (TURP) the previous year.

Preoperative urinalysis demonstrated blood and white cells. No formal midstream urine (MSU) was sent for motor cortex stimulation (MCS) preoperatively. It was decided by the pre-admission nurse that the patient did not require pre-admission assessment.

The patient then underwent a bladder neck incision using a Mercedes technique with incisions at 12, 5 and 7 o'clock. Catastrophic bleeding was encountered and the procedure was abandoned with the stone left in the patient's bladder. A urethral catheter was placed to tamponade the bleeding and the patient returned to the ward.

Approximately several hours post-procedure the patient became hypotensive and tachycardic. Possible sepsis was recognised, and the patient was given intravenous cephalosporins and transferred to the intensive care unit. The patient was placed on inotropic support and, despite having cardiac and respiratory failure on admission, appeared to improve over the first 24 hours.

By the next morning, blood culture and urine culture results taken from the previous day demonstrated E. coli. On the second morning in intensive care the patient appeared to be improving, with reducing inotropic requirements. The patient was given fresh frozen plasma for a mild coagulopathy and reduced platelets.

The patient suddenly deteriorated on the afternoon of the second day of ICU admission and was unable to be resuscitated.

The patient's family refused a postmortem. However, a coroner's report stated that the most likely diagnosis was of acute myocardial infarction secondary to gram-negative sepsis and subsequent multi-organ failure.

Assessor's Comment

This patient suffered an adverse event, and there are several areas where comment can be made regarding preoperative assessment and operative technique.

The decision not to have a pre-admission assessment, and therefore a lack of preoperative MSU, is an area for concern. Treatment with antibiotics of the E. coli urinary infection prior to admission to hospital and surgery may well have altered the outcome for this patient.

It is increasingly difficult to ensure that patients do have appropriate preoperative investigations in an era of increasing utilisation of day of surgery admission. However, this does not excuse a lack of appropriate investigation, and should be followed up by the hospital and surgeon involved.

The operative technique utilised is also an area for consideration. Incisions at 12 o'clock, particularly post-TURP, have a high risk of entering the dorsal venous complex and being associated with catastrophic bleeding.

This is what occurred in this case, subjecting the patient to direct venous exposure to infected urine. Incisions at 5 and 7 o'clock, which might be considered more standard treatment, would have been less likely to precipitate this event.

Once the patient's condition deteriorated, the standard of record keeping and further management in the intensive care unit were excellent.

Case study 14

Strangulated hernia

Case Summary

An elderly patient who lived independently experienced excruciating pain in the left groin. The patient's general practitioner referred the patient to an emergency department where a pelvic x-ray was reported as being normal and the patient was subsequently discharged. Some days later the patient was admitted with continuing colicky lower abdominal pain and 'feculent vomiting'.

On examination the patient had a soft abdomen with slight epigastric tenderness. Bilateral reducible inguinal herniae were recorded. Comorbidities included atrial fibrillation, hypertension, hypercholesterolaemia and gastro-eosophageal reflux.

Current medications were atenolol, telmisartan, simvastatin and aspirin. A plain abdominal x-ray showed multiple fluid levels but no dilated small bowel loops.

IV fluids were given and a nasogastric tube (NGT) was inserted when further vomiting occurred. Unfractionated heparin and TEDs were implemented from admission. The following day the consultant surgeon noted lower abdominal tenderness. No flatus had been passed halfway through the week.

A CT scan reported 'a right femoral hernia associated with a small bowel obstruction and a large left ovarian cyst'. Surgery was organised to be performed on a routine list some time later. The patient, by this time, had been without nutrition for a week and in a situation that would be uncorrected for at least another 2 days.

That evening the patient developed atrial fibrillation (AF) which was managed by the cardiology team. A gynaecologic opinion was considered that an oophorectomy was advisable but that the cyst was unlikely to be malignant. That evening the patient became hypotensive and bradycardic, probably secondarily to a sick sinus syndrome from the metoprolol prescribed for the AF.

A laparotomy revealed small bowel herniating through a pudendal hernia, but incorrectly recorded as a 'right buttock hernia with small bowel herniating through a small defect posterior to the inferior pubic ramus'. Resection of small bowel with a stapled re-anastomosis was needed. In the ICU the following day TPN was initiated.

Several postoperative days later coffee grounds were aspirated from the NGT. Gastroscopy demonstrated ulcerative oesophagitis. Heparin and aspirin were withheld. AF was present and an amiodarone infusion started.

The patient developed a right-sided hemianopia caused by an occipital infarct seen on CT. Aspirin and heparin were recommenced. A faecal fistula developed in the abdominal wound with no local or systemic sepsis.

Nearly 2 weeks later, an ICU transfer was needed as the patient became distressed, hypotensive and tachypnoeic due to complete heart block. Intubation was implemented and inotropes given. After discussion with the family, treatment was withdrawn and the patient died later that day.

Assessor's Comment

The delay to perform a laparotomy was the reason this patient died. Obvious symptoms had been present for 4 days at admission. From the onset of symptoms to surgery, the patient developed cardiovascular complications and nutritional depletion which contributed to the patient's demise.

The possibility that the bowel obstruction was due to a hernia was excluded on the basis that the detectable hernias were non-tender and reducible.

These hernias should not have distracted the patient's carers from diagnosing the cause of the obstruction, which should have been diagnosed by an earlier CT scan. The operation was further delayed to coincide with an operating list convenient to the admitting surgeon.

Postoperatively rosive oesophagitis was possibly caused by a combination of faecal vomiting and the NGT. This prompted cessation of thrombo-prophylaxis which resulted in the subsequent stroke and cardiac complications. The formation of a fistula added to this patient's morbidity.

Case study 15

Intubation for transfer

Case Summary

A middle-aged patient with a headache in the morning collapsed shortly after. The patient arrived at a rural hospital at nearly 2 hours later and triaged as a '2' with motor response not recorded, pupils dilated.

The secondary hospital emergency department advised transfer unintubated. During ambulance transfer, airway intervention was resisted despite the patient being unconscious with fixed dilated pupils. By around midday the patient arrived at the second hospital, breathing spontaneously.

A chest x-ray demonstrated aspiration. Severe hypertension was treated with hydralazine resulting in hypotension. The CT scan demonstrated a massive subarachnoid haemorrhage from a giant basilar aneurysm, with hydrocephalus and evidence of posterior cerebral artery infarction.

By mid-afternoon mannitol was started. The intracranial pressure was greater than 50 with the insertion of an external ventricular drain. Sedation was ceased and the patient remained unresponsive with unreactive pupils. The patient was palliated and brain death was certified the next day.

Assessor's Comment

In an ideal situation the patient should have been intubated, ventilated and sedated prior to transfer. This would prevent aspiration (if it had not already occurred), help maintain pO2 and possibly help control intracranial pressure by preventing the pCO2 from rising.

The drugs used for this would need to be administered by someone experienced in airway management, and would have helped intracranial pressure and brain perfusion. The logistics of communications between rural and major hospitals should be a priority of hospital managements.

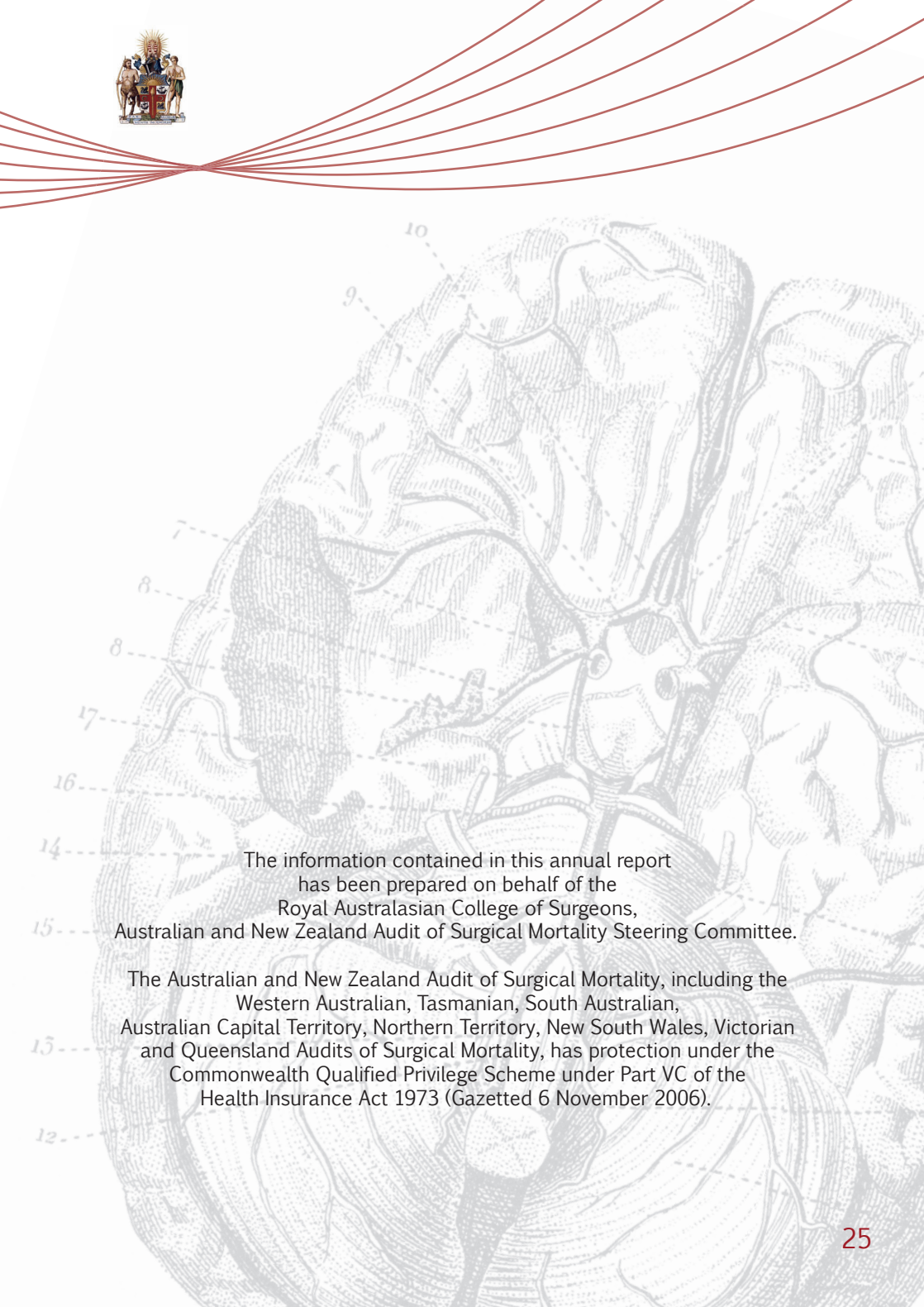
Advice between hospitals regarding these treatments should occur, as most of these treatments can be implemented in the rural setting, if staff have the skills.Training staff with appropriate skills for this type of emergency is also an issue for management.

There was no neurologic assessment chart in the rural hospital record; hence pupil responses were not recorded and motor responses were inadequately noted.

These are important components of the Glasgow Coma Scale. Absence of this chart is a reflection that hospital managements have not planned for these eventualities. The death certificate was incorrectly completed. Subarachnoid haemorrhage, not brain death, was the 'cause of death'.

Shortened forms

AF	atrial fibrillation
AFP	alpha-fetoprotein
ALT	alanine amino transferase
ANZASM	Australian and New Zealand Audit of Surgical Mortality
CT	computed tomography
DVT	deep vein thrombosis
HCC	hepatocellular carcinoma
HDU	high dependency unit
ICU	intensive care unit
INR	International Normalised Ratio
IV	intravenous
MCS	motor cortex stimulation
MET	medical emergency team
MSU	midstream urine
NGT	nasogastric tube
PE	pulmonary embolism
s/c	subcutaneous
TED	thrombo-embolism deterrent
TPN	total parenteral nutrition
TURP	transurethral resection of the prostate



The information contained in this annual report
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